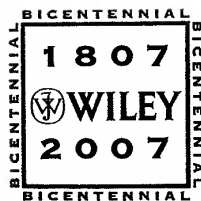


Hawley's
**Condensed Chemical
Dictionary**
Fifteenth Edition

Richard J. Lewis, Sr.



**WILEY-INTERSCIENCE
A JOHN WILEY & SONS, INC., PUBLICATION**

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Published simultaneously in Canada.

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Library of Congress Cataloging-in-Publication Data is available.

Lewis, Richard J., Sr.
Hawley's Condensed Chemical Dictionary, Fifteenth Edition
ISBN 13: 978-0-471-76865-4
ISBN 10: 0-471-76865-0

Printed in the United States of America.

10 9 8 7 6 5 4 3 2

afterblow. In the Bessemer process, continuing the blast air flow in order to remove phosphorus after the removal of carbon.

after-chromed dye. A dye that is improved in color or fastness by treatment with sodium dichromate, copper sulfate, or similar materials, after the fabrics are dyed.

after-coppering dye. A dye that is improved in color or fastness by treatment with copper sulfate, after the fabrics are dyed.

after cure. Continuing the process of vulcanizing after the cure has been carried to the proper degree and the heat is cut off.

after-flow. The action of the plastic flow in solids continuing after external forces have stopped.

after-glow. (1) The remaining luminescence in rarefied gas after electrodeless charge has passed through. (2) The glow that remains after the extinguishing of a flame.

Ag. Symbol for silver.

agar. (agar-agar). A phycolloid derived from red algae such as *Gelidium* and *Gracilaria*; it is a polysaccharide mixture of agarose and agarpectin. **Properties:** Thin, translucent membranous pieces or pale buff powder. Strongly hydrophilic, it absorbs 20 times its weight of cold water with swelling; forms strong gels at approximately 40C.

Grade: Technical, USP, FCC.

Use: Microbiology and bacteriology (culture medium); antistaling agent in bakery products, confectionery, meats, and poultry; gelation agent in desserts and beverages; protective colloid in ice cream, pet foods, health foods, laxatives, pharmaceuticals, dental impressions, laboratory reagents, and photographic emulsions.

See algae; alginic acid.

agarose gels. A polysaccharide gel used to measure the size of nucleic acids (in bases or base pairs). See "Gel Electrophoresis". The gel of choice for DNA or RNA in the range of thousands of bases in length, or even up to 1 megabase when employing pulsed field gel electrophoresis.

agate-ware. An enameled iron or steel frequently used for kitchenware.

age hardening. The spontaneous hardening of alloys at room temperature within a of couple days after quenching as a result of grain structures.

Agent Orange. A toxic herbicide and defoliant containing 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-

D), with trace amounts of dioxin. Its use has been restricted.

age-resister. See antioxidant.

agglomeration. (1) Combination or aggregation of colloidal particles suspended in a liquid into clusters or "flocs" of approximately spherical shape. It is usually achieved by neutralization of the electric charges which maintain the stability of the colloidal suspension. The terms *flocculation* and *coagulation* have a closely similar meaning.

(2) The food industry uses "agglomeration" in the sense of increasing the particle size of powdered food products. Because such powders tend to be hydrophobic because of the high surface tension of water, agglomeration causes them to be more readily dispersible in water—a process known as "instantizing." The agglomerates have varying degrees of open spaces (voids) and are loosely bound, foam-like structures. They are formed by mechanical means in chamber spray dryers, tubes, or fluidized beds, usually in the presence of moisture. See aggregation; agglutination; flocculation; coagulation.

agglutination. The combination or aggregation of particles of matter under the influence of a specific protein. The term is usually restricted to antigen-antibody reactions characterized by a clumping together of visible cells such as bacteria or erythrocytes. The antigen is called an agglutinin, and the antibody an agglutinin because of an apparent gluing or sticking action. See aggregation.

aggregate. A collective term denoting any mixture of such particulates as sand, gravel, crushed stone, or cinders used in Portland cement formulations, road building, paving compositions, animal husbandry, trickle filters, horticulture, etc.

aggregation. A general term describing the tendency of large molecules or colloidal particles to combine in clusters or clumps, especially in solution. When this occurs, usually as a result of removal of the electric charges by addition of an appropriate electrolyte, by the action of heat, or by mechanical agitation, the aggregates precipitate or separate from the dissolved state. Included in this term are the more specific terms *agglutination*, *coagulation*, *flocculation*, *agglomeration*, and *coalescence*.

aggregation technique. A technique used in model organism studies in which embryos at the 8-cell stage of development are pushed together to yield a single embryo (used as an alternative to microinjection). See model organisms.

activated sludge). All these may be used as components of useful products, e.g., (1) in steel manufacturing, (2) in roofing and road treatment compositions, and (3) as a base for fertilizers.

See sewage sludge.

“Sludge Conditioner” [*Nalco*]. TM for a series of polyelectrolytes.

Use: Conditions sludge for dewatering and settling in municipal sewage treatment plants.

slurry. A thin, watery suspension; for example, the feed to a filter press or to a fourdrinier machine; also a stream of pulverized metal ore. A special use of this term refers to a type of explosives called “slurry blasting agents” based on gelatinized aqueous ammonium nitrate, sensitized with various other explosives.

slushing agent. A nondrying oil, grease, or similar material.

Use: Coat metals to afford temporary protection against corrosion.

slush molding. A method of molding certain toys such as doll parts in which a preheated mold is filled with liquid plastic composition and then heated until the required wall thickness has formed. The remaining liquid plastic is then poured out and the mold heated further at 200–220°C until the product has completely set. The mold is then cooled and the product removed.

Sm. Symbol for samarium.

Smalley, Richard E. (1943–2005). An American who won the Nobel Prize for chemistry along with Robert F. Curl, Jr. and Sir Harold W. Kroto in 1996, the 100th anniversary of Alfred Nobel's death. The trio won for the discovery of the C_{60} compound called buckminsterfullerene. He graduated from the University of Michigan and earned a Ph.D. from Princeton University.
See buckminsterfullerene; Curl, Robert F., Jr.; Kroto, Sir Harold W.

small nuclear riboNucleoProtein. See snRNP.

small nuclear RNA (snRNA). Any of several small RNA molecules in the nucleus. Most known snRNAs have a role in the splicing reactions that remove introns from mRNA, tRNA, and rRNA molecules.

smalt.

Properties: Blue powder.

Derivation: A potash-cobalt glass made by fusing pure sand and potash with cobalt oxide, grinding, and powdering.

Use: Paint pigments, ceramic industries (pigment),

coloring glass, bluing paper, starch and textiles, coloring rubber.

“392 SmartPlate Etch” [*Hurst*]. TM for a prewetting etch.

Use: For use on laser plates.

“Smart Plate Fountain Solution” [*Hurst*].

TM for a one step fountain solution.

Use: Formulated for use with laser plates.

“394 SmartPlate Prep” [*Hurst*]. TM for liquid cleaner.

Use: Removes scattered toner particles to allow clean, sharp images.

smectic. A molecular structure (layers or planes) occurring in some liquid crystals; it imparts a soft, soapy property. There are nine types of smectic orientation.

smelting. Heat treatment of an ore to separate the metallic portion with subsequent reduction.
See roasting.

Smiles rearrangement. Intramolecular nucleophilic aromatic substitution in alkaline solution resulting in the migration of an aromatic system from one heteroatom to another.

“Smite” [*Du Pont*]. TM for emulsifiable insecticide containing 12.5% methoxychlor and 12.5% malathion.

Smith, Michael. (1932–2000). A Canadian who won the Nobel Prize for chemistry in 1993 for the development of site-specific mutagenesis.
See Mullis, Kary Banks.

smog. A coined word denoting a persistent combination of smoke and fog occurring under appropriate meteorological conditions in large metropolitan or heavy industrial areas. The discomfort and danger of smog is increased by the action of sunlight on the combustion products in the air, especially sulfur dioxide, nitric oxide, and exhaust gases (photochemical smog). Strongly irritant and even toxic substances may be present, e.g., peroxybenzoyl nitrate. Fatalities have resulted from exposure to particularly severe photochemical smogs.

See air pollution.

smoke. A colloidal or microscopic dispersion of a solid in gas, an aerosol. (1) Coal smoke: A suspension of carbon particles in hydrocarbon gases or in air, generated by combustion. The larger particles can be removed by electrostatic precipitation in the stack (Cottrell). Dark color, nauseating odor. See smog; air pollution; Cottrell. (2) Wood smoke: Light-colored particles of cellulose ash, pleasant aromatic odor. Smoke from special kinds of wood

pressure, solubility); emulsions (liquid-liquid interfaces); finely divided solid particles (adsorption, catalysis); permeable membranes and microporous materials; and biochemical phenomena such as osmosis, cell function, and metabolic mechanisms in plants and animals. Surface chemistry has many industrial applications, a few of which are air pollution, soaps and synthetic detergents, reinforcement of rubber and plastics, behavior of catalysts, color and optical properties of paints, aerosol sprays of all types, monolayers and thin films, both metallic and organic. Outstanding names in the development of this science are Graham, Freundlich, and W. Ostwald in the 19th Century and Harkins, Langmuir, LaMer, and McBain in the 20th.

See colloid chemistry.

surface tension. In any liquid, the attractive force exerted by the molecules below the surface upon those at the surface-air interface, resulting from the high molecular concentration of a liquid compared to the low molecular concentration of a gas. An inward pull, or internal pressure, is thus created which tends to restrain the liquid from flowing. Its strength varies with the chemical nature of the liquid. Polar liquids have high surface tension (water = 73 dynes/cm at 20°C); nonpolar liquids have much lower values (benzene = 29 dynes/cm, ethanol = 22.3 dynes/cm), thus they flow more readily than water. Mercury, with the highest surface tension of any liquid (480 dynes/cm) does not flow, but disintegrates into droplets.

See interface; surface-active agent.

surfactant. See surface-active agent.

"Sur-Gard" [Nalco]. TM for chemicals used for treatment of boiler water to inhibit scale and corrosion and to remove oxygen from the boiler water.

"Surlyn" [Du Pont]. TM for a group of ionomer resins.

Properties: ("Surlyn" A) Thermoplastic produced as a granular material; flexible, transparent, grease resistant; very light weight but tough. Izod impact strength 5.7–14.6 ft-lb/in (higher than any other polyolefin), tensile strength 3,500–5,500 psi, elongation 300–400%, softening point 71. Insoluble in any commercial solvent. Subject to slow swelling by hydrocarbons, to slow attack by acids.

Use: Coatings, packaging films, products made by injection or blow molding, or by thermoforming.

SUS. Abbreviation for Saybolt Universal Seconds.

See Saybolt Universal viscosity.

suspension. A system in which very small particles (solid, semisolid, or liquid) are more or less uniformly dispersed in a liquid or gaseous medium. If the particles are small enough to pass through

filter membranes, the system is a colloidal suspension (or solution). Examples of solid-in-liquid suspensions are comminuted wood pulp in water, which becomes paper on filtration; the fat particles in milk; and the red corpuscles in blood. A liquid-in-gas suspension is represented by fog or by an aerosol spray. If the particles are larger than colloidal dimensions they will tend to precipitate if heavier than the suspending medium, or to agglomerate and rise to the surface if lighter. This can be prevented by incorporation of protective colloids. Polymerization is often carried out in suspension, the product being in the form of spheres or beads.

See solution; colloidal; dispersion; emulsion; colloid chemistry.

"Sustane" [Eastman Chemical China].

TM for a low viscosity blend weighting agent for liquids.

"Sustane" [UOP]. TM for synthetic, food-grade antioxidant product line including BHA, BHT, TBHQ, propyl gallate, and liquid blends.

Use: To preserve vegetable oils, animal fats, spices, baked goods, nuts, pet foods, dressing oils, confections, cereals, sausage, cosmetics, and dehydrated potatoes.

Svedberg, Theodor. (1884–1971). A Swedish chemist who won the Nobel Prize in 1926. Author of *Die Methoden zur Herstellung Kolloider Losungen anorganischer Stoffe*. His work included research in colloidal chemistry, molecular size determination, and methods of electrophoresis, as well as the development of the ultracentrifuge for separation of colloidal particles in solution. His education was in Sweden with later work done at the University of Wisconsin before returning to Uppsalla.

Svedberg. (S). A unit of measure of the rate at which a particle sediments in a centrifugal field.

Swarts reaction. Fluorination of organic polyhalides with antimony trifluoride (or zinc and mercury fluorides) in the presence of a trace of a pentavalent antimony salt.

"Sweet Design" [Cargill]. TM for a sweetener system.

Use: In food and beverage manufacturing to produce better tasting frozen desserts and sweetened products with little or no sugar.

sweeten. (1) To add sugar or a synthetic product to foods or beverages to provide a sweet taste (flavor). (2) To deodorize and purify petroleum products by removing sulfur compounds (doctor treatment). (3) In industrial slang, to increase the quality of a low-cost product by adding more expensive ingredients.